Texas Instruments Personal Computer

February 1982, No.2

User's Newsletter

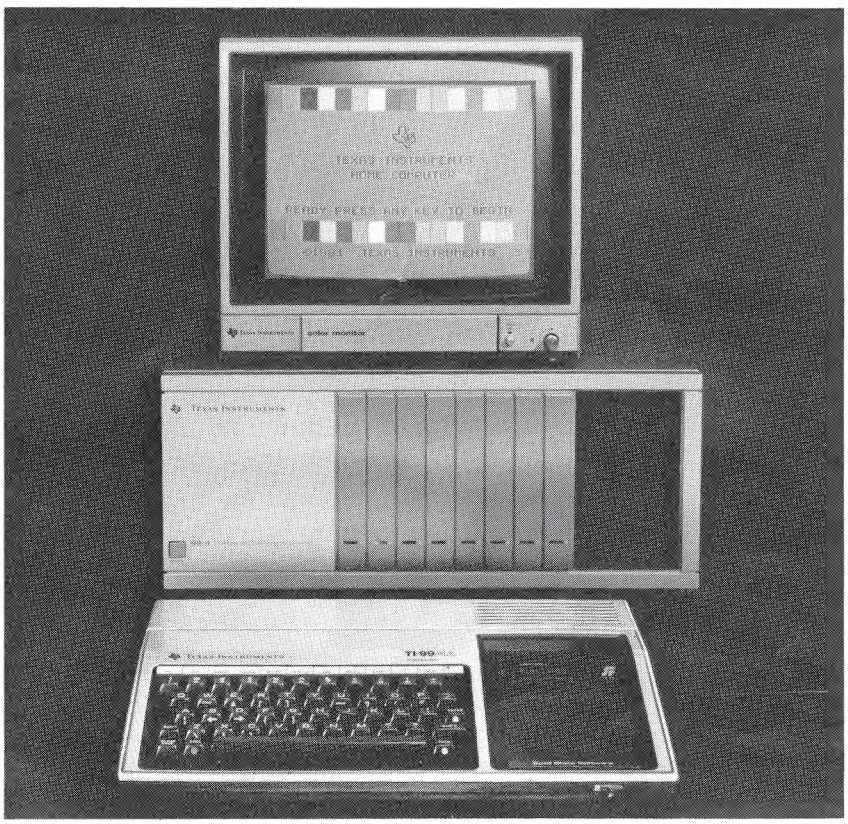
TI Announces New Peripheral Expansion System for TI-99/4 and TI-99/4A

Texas Instruments has announced a Peripheral Expansion System capable of housing up to seven peripherals for the TI-99/4 or TI-99/4A Home Computer. The unit, which measures approximately 17″ x 7″ x 12″, provides a compact, cost-effective means for you to add to the capabilities of your TI Home Computer. In addition, the Peripheral Expansion System allows you to centralize most of your equipment in one place, thereby reducing the space requirements necessary for setting up the hardware for your TI Home Computer.

The Peripheral Expansion System has eight slots for peripheral, board-type cards, one of which is used to connect the system to the computer console. You simply plug in additional peripheral cards to add the desired functions. The system also provides a space for installing one TI Disk Memory Drive within the unit itself. Up to two additional Disk Memory Drives can be added externally. A single, shielded cable connects the Peripheral Expansion System to the computer console, giving you flexibility in placing the system in relation to the computer.

The first four peripheral cards available from TI for the Peripheral Expansion System are a Memory Expansion card, P-Code card, Disk Drive Controller card, and RS232 Interface card.

(see EXPANSION SYSTEM, page 4)



The new Texas Instruments Peripheral Expansion System is capable of housing up to seven peripherals for the TI-99/4 or TI-99/4A Home Computer. It has eight slots for peripheral, board-type cards, one of which is used to connect the system to the computer console.

HOME COMPUTER FREE SOFTWARE OFFER

If you buy any four Texas Instruments *Solid State Software*™ Command Modules or one of the new Texas Instruments software albums (three modules in a convenient storage package) between February 1 and May 15, 1982, we'll send you the exciting new "Munch Man" *Solid State Software*™ Command Module. See your dealer today for order blanks and complete details.

Editor/Assembler Software Now Available

Texas Instruments now offers the new Editor/Assembler package. This package extends the flexibility of the TI-99/4 or TI-99/4A by allowing users to program the Home Computer in TMS9900 assembly language. This gives you direct access to all system features, such as sound, speech, graphics, and I/O, as well as provides the highest speed possible from the computer's 16-bit microprocessor.

Assembly language programs written with the Editor/Assembler package can be run either as stand-alone programs or linked into TI BASIC programs as subroutines. You handle the linking procedure and other tasks related to using the package via seven new TI BASIC statements provided in the software—CALL LOAD, CALL LINK, CALL INIT, CALL PEEK, CALL POKEV, CALL PEEKV, and CALL CHARPAT.

Assembly language subroutines written with the Editor/Assembler can also be called from TI Extended BASIC. The output of such subroutines is directly usable by the TI Extended BASIC program, rather than requiring conversion as was previously the case.

The Editor/Assembler package includes a *Solid State Software*™ Command Module and two floppy diskettes, plus an owner's manual which provides extensive documentation of the software's architecture. The editor and assembler are stored on one diskette, while the Command Module stores the software required to load the Editor/Assembler and execute TMS9900 assembly language programs. The diskettes also contain the source and object code for an interactive assembly language debugger. In addition, the source and object code for the game, TOMBSTONE CITY, are included as a sample program.

Also, with this package, you can execute assembly language programs written by other TI-99/4 and TI-99/4A users, provided the Editor/Assembler Command Module is plugged into the console.

The minimum system configuration required to use the Editor/Assembler package consists of a TI-99/4 or TI-99/4A console, a Color Monitor or a television equipped with Video Modulator, the TI Memory Expansion unit, and the TI Disk Memory System.

The Editor/Assembler package is available at the suggested retail price of $99.95.

The Personal Computer User's Newsletter is published by the Texas Instruments Personal Computer Division, P.O. Box 53, Lubbock, Texas 79408. All correspondence concerning this newsletter should be mailed to the above address.

Mini Memory *Solid State Software*™ Command Module To Be Available Soon

A new Mini Memory *Solid State Software*™ Command Module that increases the versatility of your Texas Instruments TI-99/4 or TI-99/4A Home Computer will soon be available from Texas Instruments. It provides additional memory for your system as well as important tools for program development. The module also contains a built-in battery, which permits the programs and data stored in the module's Random Access Memory (RAM) to be retained when the computer console is turned off, even if the module is removed from the console.

The Mini Memory module contains a total of l4K bytes of memory. This memory consists of 6K bytes of Graphics Read Only Memory (GROM), 4K bytes of Read Only Memory (ROM), and 4K bytes of RAM. Besides the 4K-byte RAM file in the Mini Memory module itself, the Memory Expansion unit, if attached, can be used by TI BASIC programs when the module is inserted in the console.

The Mini Memory module also features additional file-handling capabilities and TI BASIC subprograms. With the module, assembly language object programs and data can be loaded into memory, while several additional subprograms can be called with the TI BASIC statements.

The Mini Memory Command Module includes several program routines which permit access to the computer's resources and a resident debugging program with which you can access the internal resources of the computer system and trouble shoot your programs.

A cassette tape is enclosed with the Mini Memory module. It contains a symbolic Line-by-Line Assembler and a graphics demonstration program named LINES that is a colorful line drawing demonstration program for the TI-99/4A. The symbolic Line-by-Line Assembler allows you to enter TMS9900 assembly language source code, one line at a time, directly from the computer keyboard.

The Mini Memory Command Module with the accompanying cassette tape will be available in March of 1982 at the suggested retail price of $99.95.

© 1982 Texas Instruments Incorporated

New UCSD p-System* P-Code Peripheral and Software for the TI Home Computer

A new UCSD p-System P-Code peripheral and three diskette-based software packages for the TI-99/4 or TI-99/4A Home Computer soon will be available. The P-Code peripheral allows your TI Home Computer to access the UCSD p-System and a variety of programming languages, including UCSD Pascal* and Pilot. In addition, FORTRAN and BASIC compilers compatible with the p-System will be available later in the year.

The new P-Code peripheral is available as either a standard TI peripheral package or a P-Code card for the Peripheral Expansion System. The new software packages include the Pascal compiler to compile Pascal programs into "p-code"; an editor, filer, and utilities package for screen editing and file management; and an assembler/linker package for developing TMS9900 assembly language programs.

Using UCSD Pascal, Version IV.0, the new p-System will allow you to write more efficient programs on the Home Computer, and will also allow you to run many existing UCSD Pascal programs with little, if any, modification. UCSD Pascal is a highly structured, efficient programming language that is faster, more logical, and substantially more powerful than TI BASIC. It is highly applicable for the programming student and offers greater programming power for the advanced software author. Where BASIC programs are developed as a series of sequential lines, Pascal programs are block-structured so that logical elements of a program are developed an entire unit at a time.

The UCSD p-System was developed originally for small computers by the University of California at San Diego and supports UCSD Pascal, Version IV.0. Version IV.0 was developed by Softech Microsystems, exclusive licensee for UCSD Pascal Version, IV.0. In addition to being more portable than previous versions, Version IV.0 offers new features and characteristics in the areas of memory management and scheduling services as well as important new options for the applications program developer. In addition, it establishes a modern and powerful operating system conducive to the future growth of the system.

One of the most important benefits of programs written for the UCSD p-System is their portability. Programs developed for the TI-99/4 or TI-99/4A Home Computer can be run on other computers, often with no modification, through the use of a pseudo-code, or "p-code," compiler. Likewise, UCSD Pascal programs developed for other computers can be run on the TI Home Computers with little, if any, modification.

Using the P-Code system, programs written in Pascal go through a compiler program where they are translated first into the pseudo-code. This pseudo-code is then translated by a pseudo-machine interpreter designed specifically for the particular computer.

The UCSD p-System also offers the ability to run other languages as they become available. The advantage is that the compiled programs will execute faster and occupy less memory space than those generated by the resident interpreted TI BASIC. In addition, the new system includes an assembler and linker to allow programming of the TI-99/4 or TI-99/4A in TMS9900 assembly language.

To run the UCSD p-System and Pascal on the TI Home Computer requires the Memory Expansion unit and the new P-Code peripheral or P-Code Peripheral Expansion System card. Additionally, development of the p-System software requires the Disk Drive Controller, at least one Disk Memory Drive, and the applicable diskette software package. Suggested retail price of the new peripheral is $399.95. The new card's suggested retail price is $249.95. Prices for the new software packages are:

UCSD Pascal Compiler Model Number PHD5063	$124.95
UCSD p-System Assembler/Linker Model Number PHD5064	$99.95
UCSD p-System Editor/Filer/Utilities Model Number PHD5065	$74.95

All of these will be available from your local dealer in the second quarter of 1982.

*UCSD Pascal and UCSD p-System are trademarks of the Regents of the University of California.

Non-TI products are listed in this newsletter for your information. Their inclusion does not represent an endorsement by TI, and lists are not necessarily complete.

The Memory Expansion card has the same features as the current TI Memory Expansion unit, which adds 32K bytes of Random Access Memory (RAM) to the Home Computer.

The P-Code (pseudo-code) card is identical to the UCSD p-System* P-Code peripheral. Either of the peripheral units allows your TI Home Computer to access a variety of programming languages, including UCSD Pascal* and Pilot.

The Disk Drive Controller card has all the capabilities of TI's Disk Drive Controller peripheral, plus the ability to handle double-sided, 5¼-inch diskettes. The current unit only controls Disk Memory Drives for single-sided, 5¼-inch diskettes.

In addition to performing all the interfacing functions of the original TI RS232 Interface peripheral, the new RS232 Interface card provides a parallel port for interfacing with printers. This added capability saves users the expense of purchasing an RS232 Interface accessory for their printers.

The Peripheral Expansion System and the four cards will be available in the second quarter of 1982. The suggested retail prices of the devices are as follows:

Device	*Price*
Peripheral Expansion System	$249.95
Memory Expansion card	$299.95
P-Code card	$249.95
Disk Drive Controller card	$249.95
Expansion Box Disk Drive	$399.95
RS232 Interface card	$174.95

*UCSD Pascal and UCSD p-System are trademarks of the Regents of the University of California.

Personal Record Keeping *Info World* Report Card

An article entitled *Personal Record Keeping from Texas Instruments* by Lawrence R. De Rusha, Jr. was published in the January, 1982, User's Newsletter. Reprinted from *Info World*, the article inadvertently omitted the ratings on the *Info World Software Report Card*. Those ratings on the Personal Record Keeping *Solid State Software*™ Command Module are as follows:

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	☑
Documentation	☐	☐	☑	☐
Ease of Use	☐	☐	☐	☑
Error Handling	☐	☐	☐	☑

System Requirements

- TI-99/4 or TI-99/4A
- One TI Disk Memory System or cassette recorder
- Printer optional

Price $49.95

TI Users' Groups Continue to Grow

One more Users' Group is now active in the United States with two more in the organizational stage. These Users' Groups and others around the world are exceedingly helpful to those interested in sharing technical information, keeping up-to-date on new hardware and software, and exchanging thoughts and ideas.

The active Users' Group is:

Portland Area

Portland Users of Ninety Nines(PUNN)
R.S. Chase
421 Northwest 69th St.
Vancouver, Washington 98665
(206)695-7002

TI-99/4 and TI/994A users in the Los Angeles area are in the process of forming several additional groups to accommodate all interested individuals. If you are interested in these groups, contact the following individuals:

Hacienda Heights Area

Ed Santogrossi
(714)521-3910
(213)968-2731

Redondo Beach Area

Bob Saunders
(213)540-1089
Arnie Setz
(213)370-0529

Random Bits

Editor's Note: This column presents suggestions and ideas for using the TI-99/4 and TI-99/4A Home Computer and its accessories. We would like to publish your programming problems, solutions, and ideas. Send letters to:

Personal Computer Newsletter
Texas Instruments Incorporated
P.O. Box 53
Lubbock, TX 79408
Attn: Editor

International Home Computer Users' Association

In the January, 1982, User's Newsletter, the price for an Associated Membership in the International Home Computer Users' Association was stated incorrectly. The correct amount for this membership, which is for the Users' Groups Only category, is $65 annually.

Resequencing Records for Inventory and Invoicing

One of the features of the TI Home Computer Inventory and Invoicing Packages is that they allow you to make use of the features of the Personal Record Keeping and Statistics *Solid State Software*™ Command Modules in analyzing the data files created by the Inventory and Invoicing Programs. The following lines of code will help you if you wish to resequence your files based on a sort done with the Personal Record Keeping module. Use the following steps:

1) Run the "CONVERT1" program on your data files in Inventory or Invoicing according to manual directions.

2) Use Personal Record Keeping to run the sort on the desired fields and save the resulting file.

3) Load the "CONVERT2" program for inventory or invoicing and add the following lines of code:

For Inventory Management Program: CONVERT2

```
515 CALL D(8,2,12,"FIRST
ITEM # ")
516 CALL A(8,15,3,C,ID,1,
900)
570 CALL G(A,I,A,C,IA)
850 CALL D(10,15,3,STR$
(ID))
855 ID=ID+1
```

For Invoice Management Program: CONVERT2

```
535 CALL D(8,2,17,"FIRST
CUSTOMER # ")
536 CALL A(8,19,4,C,ID,1,
MAXC)
580 CALL G(A,I,A,T,IA)
830 CALL D(10,19,3,STR$
(ID))
835 ID=ID+1
```

4) Save the program "CONVERT2" as program "CONVERT2A" and run the program. Enter the number of the first item or customer to be replaced. This causes the program to replace the records on your existing file with the resequenced ones.

Note: This method can also be used to copy records from one part of your file to another. For example, you could run "CONVERT1" on records 1 through 50. Then run "CONVERT2" and specify "100" as the starting record. This would, in effect, duplicate the information in records 1 through 50 into records 100 through 149.

TI Issues Latest Home Computer Program Library

The new Program Library for the TI Home Computer accompanies this newsletter and lists the software packages available from TI and other companies. More than 185 packages are described by application category, including education, entertainment, home management, and other applications. Information on each one of these packages includes the media, title, brief description, required or recommended peripherals, and suggested retail price for the Texas Instruments brand software. In the latter section of the Program Library, a more comprehensive list of over 650 packages is given.

Software packages are now being produced in three media—*Solid State Software*™ Command Modules, cassettes, and diskettes. Presently, over 75 software packages are available from Texas Instruments, and many more are being developed. Numerous packages, covering a wide range of applications, have been produced by other companies. Ordering information has been included in the Program Library so that you can purchase these software packages directly from their producers. Please note on page 17 of the Program Library the latest releases to our entertainment packages.

As the number of software packages for the TI-99/4 and TI-99/4A increases, the Home Computer Program Library will be revised. To obtain the latest updates of the software listings, call toll-free 1-800-858-4565 (outside of Texas) or 1-800-692-4279 (within Texas).

Software for the TI Home Computer

After all the magic of the in-store computer demonstrations; after a system has been selected, purchased, carried home, unpacked, and installed; after studying the instructions and finally turning on the system; a most critical juncture is reached by the new computer owner. Now the system must be made to work.

The best of computer hardware—the physical elements that make up a computer system—is only as good as what it will do. To do anything requires software—the programmed sequence of instructions that the computer will act upon to accomplish the assigned task.

Software for the TI Home Computer is designed to make that first experience as easy as possible. Contributing to the ease and simplicity of operation is TI's exclusive library of *Solid State Software*™ Command Modules. No other software program storage system is as convenient or as easy to use. Developed initially for the TI line of advanced programmable calculators, Command Modules are compact, permanently programmed packages that contain one or more Read Only Memory (ROM) integrated circuits. Each integrated circuit stores an enormous amount of information used by the TI Home Computer to perform specific functions. To gain access to this information, you need only plug the module into the slot on the computer console. This provides instant access to the program. To run the program, you simply follow the instructions provided on the display screen.

Solid State Software™ Command Modules may contain programs written in TMS9900 Assembly language, TI BASIC, UCSD Pascal*, or Graphics Programming Language (GPL). Two other forms of computer software employ magnetic media to store programs. These forms are standard audio cassette tapes and 5¼-inch floppy diskettes. They require a cassette recorder or a Disk Drive Controller with one or more Disk Memory Drives.

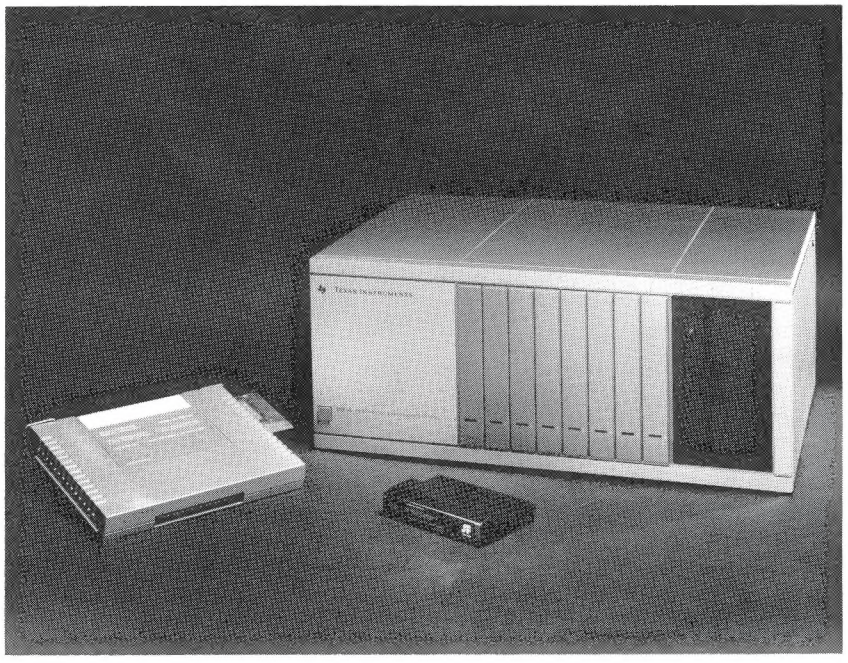
Texas Instruments has been actively working with a variety of software publishers to rapidly expand the software library for the TI-99/4 and TI-99/4A. This library is now in excess of 1000 packages and growing.

*UCSD Pascal is a trademark of the Regents of the University of California.

Potential Tax Benefits

If you purchased a personal computer after January 1, 1981, and are using it in your business or for "personal" investments, the *Economic Recovery Tax Act of 1981* may allow you to write off some part of the total system over five years, without reduction for salvage value. In addition, the hardware may qualify for the 10% investment tax credit. The amount of depreciation and tax credit allowed depends on what portion of the time you use the system in your business or for investment.

Please consult the IRS or your tax advisor for more detailed information regarding these potential tax benefits.



Shown to the left of the new compact TI Peripheral Expansion System is one of the peripheral, board-type cards. In the forefront is a TI *Solid State Software*™ Command Module.

Texas Instruments invented the integrated circuit, the microprocessor, and the microcomputer. Being first is our tradition.